
# $\vec{p} + p$ @ 510 GeV

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Time Meeting

Feb. 14, 2017

| Run | Energy | Duration | System | Goals |
|---|---|---|---|---|
| 17 | $\sqrt{s_{NN}}$=510 GeV | 13-wk | Transverse p+p | $A_N$ of $W^{\pm}$, $\gamma$, Drell-Yan, $\mathcal{L}$=360 $pb^{-1}$, 55% pol |
| | | 1-wk | p+p | RHICf |
| | | 2-wk | CeC | |
| | $\sqrt{s_{NN}}$=62.4 GeV | 4-wk | Au+Au | Jets, dileptons, NPE 1.5B MB |

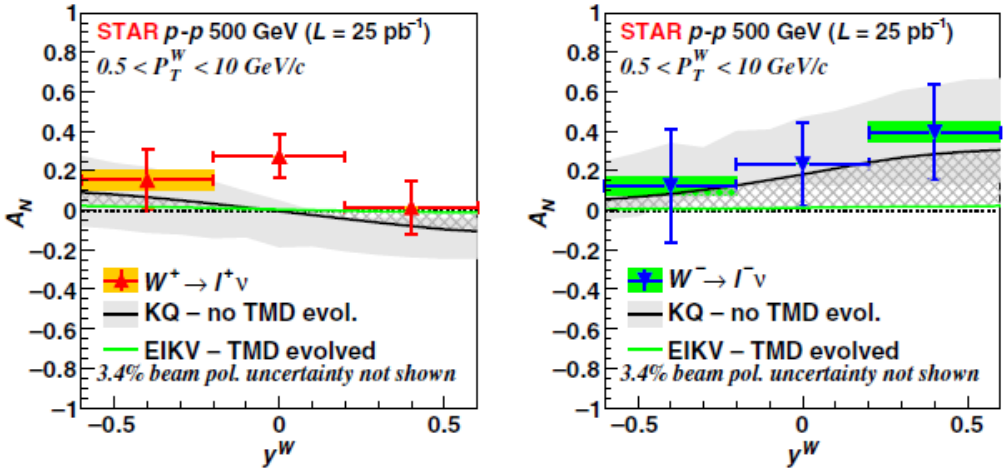
BROOKHAVEN NATIONAL LABORATORY

U.S. DEPARTMENT OF ENERGY | Office of Science

# W-Boson Production

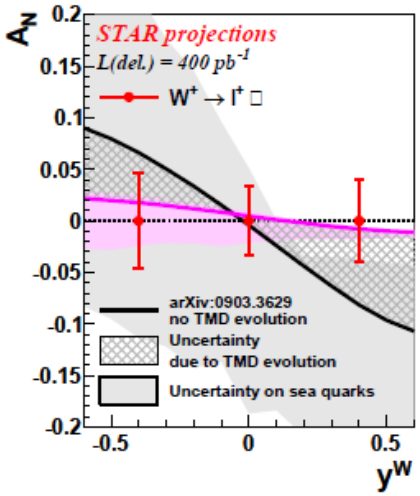
PRL 116, 132301 (2016) PHYSICAL REVIEW LETTERS week ending 1 APRIL 2016

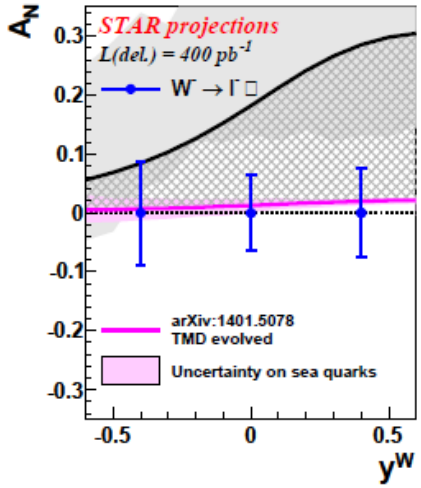
**Measurement of the Transverse Single-Spin Asymmetry in $p^{\uparrow} + p \rightarrow W^{\pm}/Z^{0}$ at RHIC**










- Sign change in Sivers function

$$f_{1T}^{\perp}(x, k_{\perp}, Q^2)\Big|_{SIDIS} = -f_{1T}^{\perp}(x, k_{\perp}, Q^2)\Big|_{p+p}$$

- Effect of TMD evolution

$$\sqrt{s} = 500 \text{ GeV}$$

$$L = 400 \text{ pb}^{-1}$$

$$P = 55\%$$

Trigger $E_T > 12$ GeV

$$P_T^e > 25 \text{ GeV/c}$$

$$0.5 < P_T^W < 10.0 \text{ GeV/c}$$

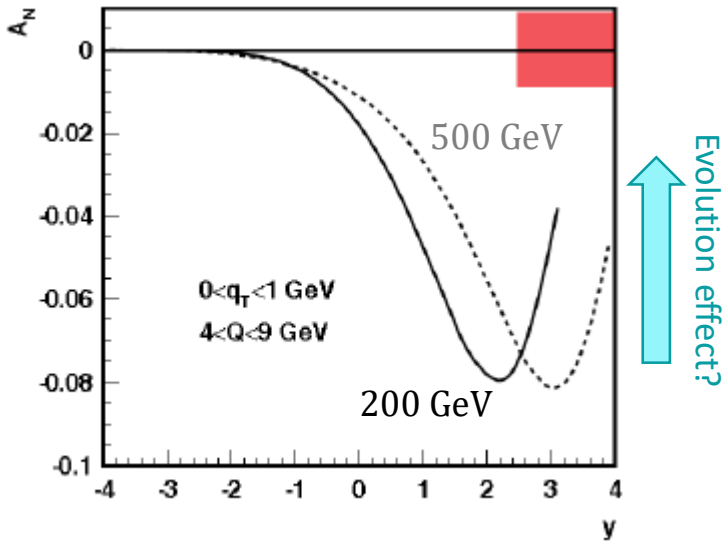
Optimized W reconstruction at

$$f_{ZDC} = 330\ k\text{Hz}$$

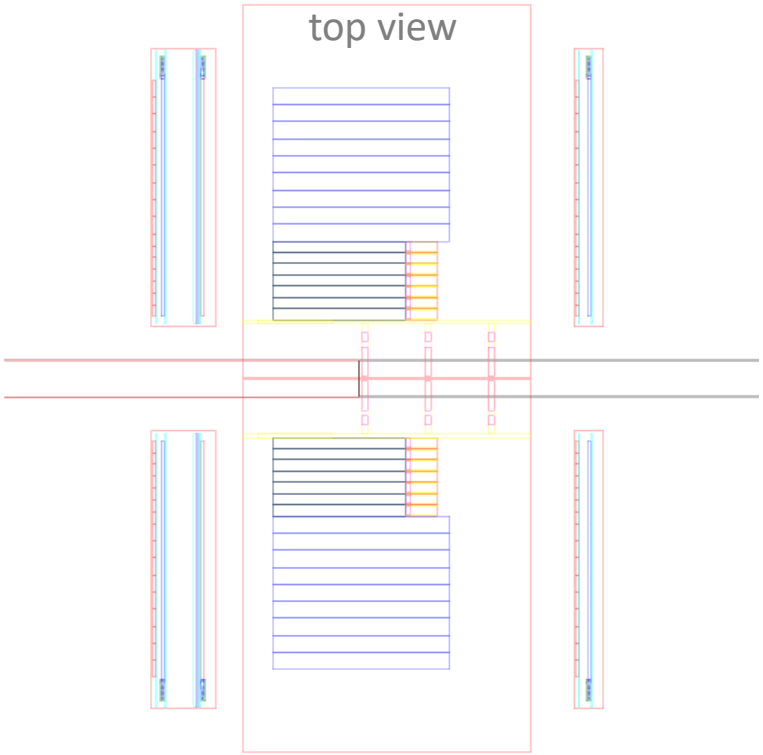
$$L = 1.5\sim1.6 \cdot 10^{32}\text{cm}^{-2}\text{s}^{-1}$$

# Drell-Yan Production






FPS / FMS / FPOS




At forward rapidity

QCD background $10^5 - 10^6$

$\sqrt{s} = 500$ GeV

$L = 400\ \text{pb}^{-1}$

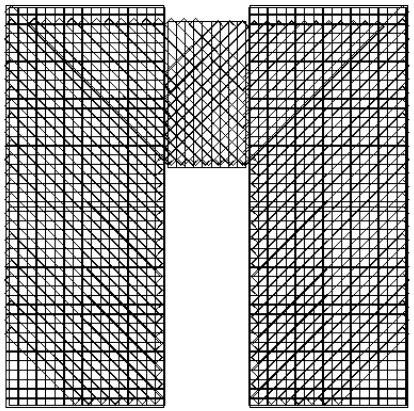
$P = 55\%$

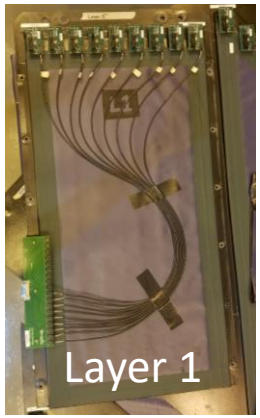
$E_e > 15$ GeV

FPOS front view

6 layers

Two-dimensional matching of FMS clusters





# Detector Readiness

- Taking cosmics data at the moment
- Final commissioning
  - Modified slow controls
  - Surveyed Roman pots
- Forward Calorimetry
  - UV-LED for curing of radiation damage
  - New FPOST hodoscope is ready
  - Radiation monitoring for SiPM
- Waiting for collisions to time in subsystems

# Trigger Rates

- 12.5 weeks, delivered 48 $pb^{-1}$ per week, 85 DAQ hours per week
- TPC triggers

| | trigger | rate (Hz) | goal | pre-scale | physics |
|---|---|---|---|---|---|
| Spin | BHT3 | 40 | 400$pb^{-1}$ | x | W/Z |
| | EHT1 | 20 | 400$pb^{-1}$ | x | W/Z |
| | JP2 | 70 | 400$pb^{-1}$ | x | Collins/IFF |
| | JP1*VPDMB30 | 70 | 250M | y | Collins/IFF |
| | JP0*VPDMB30 | 100 | 400M | y | Collins/IFF |
| | VPDMB30 | 400 | 1.5B | y | Collins/IFF |
| | total | 700 | | | |
| MTD | di-muon | 260* | 400$pb^{-1}$ | | Y |
| Heavy Flavor | BHT1*VPD100 | 180 | 300$pb^{-1}$ | x | D,J/Ψ,Y |
| | BHT2*BBCMB | 120 | 300$pb^{-1}$ | x | D,J/Ψ,Y |
| | total | 300* | | | |
| CEP (RP) | CPT | 300* | 1.2B | ~1 | CEP/DPE |
| Excl. J/Ψ | J/psi HT-TP | 40 | 400$pb^{-1}$ | x | J/Ψ |
| Total | | 1600 | | | |

- Fast FMS triggers will be separate ( >1 kHz )